

**REMARKS**

**I. INTRODUCTION**

Initially, Applicants thank the Examiner for the indication that claim 33 is allowed, and that claim 32 would be allowed if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Independent claims 1 and 17 have been amended herein. Claims 5, 9 and 21 were previously cancelled, without prejudice. Accordingly, claims 1-4, 6-8, 10-20 and 22-33 are under consideration in the present application. Provided above, please find a claim listing indicating the claim amendments and current status of the claims on separate sheets so as to comply with the requirements set forth in 37 C.F.R. § 1.121. It is respectfully submitted that no new matter has been added, and that no new issue is raised, by way of the amendments to claims 1 and 17.

**II. REJECTION UNDER 35 U.S.C. § 102(b) SHOULD BE WITHDRAWN**

Claims 17-20 and 27 stand finally rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by U.S. Patent No. 4,384,886 issued to Stiff (hereinafter “Stiff”). Claims 17-19 and 22-27 stand finally rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by U.S. Patent No. 1,704,029 issued to Baily (hereinafter “Baily”).

Applicant respectfully asserts that the references identified above do not disclose the subject matter recited at least in amended independent claim 17, and the claims which depend therefrom, for at least the reasons provided herein below.

In order for a claim to be rejected as anticipated under 35 U.S.C. § 102, each and every element as set forth in the claim must be found, either expressly or inherently

described, in a single prior art reference. Manual of Patent Examining Procedures, §2131; also see *Lindeman Maschinenfabrik v. Am Hoist and Derrick*, 730 F.2d 1452, 1458 (Fed. Cir. 1984).

Amended independent claim 17 recites, *inter alia*, an apparatus for extraction of zinc and lead, comprising a first furnace chamber that defines a reduction zone, a first arrangement comprising an outlet from the first furnace chamber structured to collect said zinc vapour from the first furnace chamber by flow of the zinc vapour into the outlet, a second arrangement comprising a condensing arrangement in communication with said outlet and structured to receive the collected zinc vapour and to cool the vapour therein to form liquefied or solid zinc, a second furnace chamber in communication with said first furnace chamber to receive therefrom material remaining after said zinc vapour has been collected from the first furnace chamber, a heating arrangement configured to further heat the remaining material in the second furnace chamber to a temperature sufficient to effect melting of the iron and lead therein, and a third arrangement configured to separately recover the molten iron and separately recover the molten lead therefrom.

Stift discloses an apparatus and method for removing zinc from oxide containing iron sources. (See Stift, Abstract). The treatment takes place within a single chamber defined by a vertically oriented shaft style muffle furnace 1 which has an upper pre-heating and pre-reduction zone 4 and a lower reduction zone 5, and vaporized zinc is gathered through a ring of apertures 10 roughly at the axial midpoint of the furnace and carried to a zinc condenser 13. (See *Id.*, Fig. 1). There is no melt product and the solid

residue is removed from the bottom of the furnace by a screw auger 18 and gate valves 8, 9. (See *Id.*, col. 5, ln. 34 – col. 6, ln. 18).

In contrast, amended independent claim 17 specifically recites that the first arrangement comprises an outlet from the first furnace chamber that is structured to collect zinc vapour from the first furnace chamber by flow of the zinc vapour into the outlet, and that the second arrangement comprises a condensing arrangement in communication with the outlet to receive and cool the zinc vapour therein. Further, as recited in amended independent claim 17, a second arrangement is provided to receive the material remaining after the zinc vapour has been collected from the first furnace chamber, and a heating arrangement to heat this material to effect melting of the iron and lead therein.

The Examiner alleges that the first and second furnace chambers recited in amended independent claim 17 are disclosed by zones 4 and 5 in Stift. Applicants respectfully disagree. There is only one furnace chamber in Stift - which is the only chamber within shaft furnace 1. Zone 4 of Stift is a pre-heating and a pre-reduction zone, and zone 5 is a reduction zone. (See Stift, Abstract). As evident from Fig. 1 of Stift, the vaporizing zinc is collected from both zones 4 and 5. Indeed, since zone 5 of Stift is the reduction zone, the vaporizing zinc is primarily collected from zone 5 rather than from zone 4. Thus, the vaporizing zinc would be collected in Stift from the Examiner's equated "second furnace chamber", not from the first furnace chamber as recited in amended independent claim 17.

Accordingly, Stift only describes a furnace chamber and an outlet 10 to collect zinc vapour from the furnace chamber, which outlet is coupled to a zinc condenser 13.

There is no second furnace chamber described in Stift with a heating arrangement configured to heat the remaining material in the second furnace chamber to a temperature sufficient to effect melting of the iron and lead therein, as recited in amended independent claim 17. Even if zone 5 can be equated to Applicants' claimed "second furnace chamber", there is no disclosure in Stift that in zone 5, the material is heated to a temperature sufficient to effect melting of the iron and lead therein, as also recited in amended independent claim 17.

Finally, Stift completely fails to disclose a third arrangement as recited in amended independent claim 17, which is configured to separately recover the molten iron and to separately recover the molten lead therefrom. Accordingly, Stift fails to anticipate at least amended independent claim 17.

Turning to Baily, this publication describes a process and apparatus for reducing ores and oxides used as ores. (See Baily, col. 1, Ins. 1-11). As provided above, amended independent claim 17 recites a first furnace chamber and a first arrangement comprising an outlet from the first furnace chamber to collect the zinc vapour from the first furnace chamber. In Baily, the zinc collection point 35 is from the melt chamber 4 and is indeed just above the level of the melt, as shown in Fig. 1 of Baily. If the recited first furnace chamber is equated by the Examiner to item 2 of Baily (see Final Office Action, p. 3, lines 11-15), then the collection point 35 is not "an outlet from the first furnace chamber", as recited in amended independent claim 17.

Amended independent claim 17 also recites that the first arrangement comprises an outlet from the first furnace chamber that is structured to collect zinc vapour from

the first furnace chamber by flow of the zinc vapour into the outlet. In Baily, zinc vapour is not collected until the *second* furnace chamber.

Further, amended independent claim 17 recites a second furnace chamber to receive material remaining after the zinc vapour has been collected from the first furnace chamber, and a heating arrangement configured to further heat the remaining material in the second furnace chamber to a temperature sufficient to effect melting of the iron and lead therein. Baily does not disclose such a structure. Indeed, Baily does not describe *any* structure to further heat the remaining material. Further, Baily fails to disclose a third arrangement configured to separately recover the molten iron and to separately recover the molten lead therefrom, as recited in amended independent claim 17. Accordingly, Baily fails to anticipate at least amended independent claim 17.

Thus, Applicants respectfully submit that the references of Stiff and Baily relied on by the Examiner fail to disclose, either expressly or inherently, each and every element of amended independent claim 17 as required by 35 U.S.C. § 102.

Regarding the § 102(b) rejections of claims 18-25 and 22-27, which depend from amended independent claim 17, Applicants respectfully assert that Stiff and Baily fail to disclose at least the recitations of amended independent claim 17. Therefore, claims 18-25 and 22-27 are also patentable over the cited references at least for the reasons as set forth above with respect to amended independent claim 17.

Therefore, for at least the reasons as presented herein above, Applicants respectfully request withdrawal of the 35 U.S.C. § 102(b) rejection of claims 17-20 and 27 as being allegedly anticipated by Stiff, and withdrawal of the 35 U.S.C. § 102(b) rejection of claims 17-19 and 22-27 as being allegedly anticipated by Baily.

**III. REJECTION UNDER 35 U.S.C. § 103(a) SHOULD BE WITHDRAWN**

Claims 1-4, 6-8, 10, 15 and 16 stand finally rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over U.S. Patent No. 5,843,204 to Ishikawa et al. (hereinafter “Ishikawa”), in view of U.S. Patent No. 5,139,567 to Matsuoka et al. (hereinafter “Matsuoka”). Claim 11 stands finally rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Ishikawa in view of Matsuoka, and further in view of U.S. Patent No. 3,647,417 to Wetzel et al. (hereinafter “Wetzel”) or U.S. Patent No. 2,014,873 to Wildman (hereinafter “Wildman”). Claims 12 and 13 stand finally rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Ishikawa in view of Matsuoka, and further in view of U.S. Patent No. 4,525,208 to Yasukawa et al. (hereinafter “Yasukawa”). Claim 14 stands finally rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Ishikawa in view of Matsuoka and Yasukawa, and further in view of U.S. Patent No. 2,855,290 to Freeman (hereinafter “Freeman”). Claims 21-25 and 27 stand finally rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Stiff, in view of U.S. Patent No. 6,264,725 to Stockinger et al. (hereinafter “Stockinger”). Claims 21 and 23-27 stand finally rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Stiff, in view of U.S. Patent No. 6,875,251 to Gordon et al. (hereinafter “Gordon”). Claims 28-31 stand finally rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Stiff in view of Stockinger or Gordon, and further in view of U.S. Patent No. 3,592,631 to Cattelain (hereinafter “Cattelain”). Claims 28-31 stand finally rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Baily, in view of Cattelain.

“To reject claims in an application under Section 103, an examiner must show an un rebutted *prima facie* case of obviousness.” *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998). The Supreme Court in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966), stated:

Under Section 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.

Indeed, to sustain a rejection under 35 U.S.C. § 103(a), there must be some teaching, other than the instant application, to alter the prior art to arrive at the claimed invention. “The problem confronted by the inventor must be considered in determining whether it would have been obvious to combine the references in order to solve the problem.” *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 679 (Fed. Cir. 1998).

The objective standard for determining obviousness under 35 U.S.C. § 103, as set forth in *Graham v. John Deere, Co.*, 383 U.S. 1 (1966), requires a factual determination to ascertain: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; and (3) the differences between the claimed subject matter and the prior art. Based on these factual inquiries, it must then be determined, as a matter of law, whether or not the claimed subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the alleged invention was made. *Graham*, 383 U.S. at 17. Courts have held that there must be some suggestion, motivation or teaching of the desirability of making the combination claimed by the applicant (the “TSM test”). See *In re Beattie*, 974 F.2d 1309, 1311-12 (Fed. Cir. 1992). This suggestion or motivation may be derived from the prior art itself, including references or

disclosures that are known to be of special interest or importance in the field, or from the nature of the problem to be solved. *Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996).

Although the Supreme Court criticized the Federal Circuit's application of the TSM test, see *KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, (2007) the Court also indicated that the TSM test is not inconsistent with the *Graham* analysis recited in the *Graham v. John Deere* decision. *Id.*; see *In re Translogic Technology, Inc.*, No. 2006-1192, 2007 U.S. App. LEXIS 23969, \*21 (October 12, 2007). Further, the Court underscored that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *KSR*, 127 S. Ct. at 1741. Under the precedent established in *KSR*, however, the presence or absence of a teaching, suggestion, or motivation to make the claimed invention is merely one factor that may be weighed during the obviousness determination. *Id.* Accordingly, the TSM test should be applied from the perspective of a person of ordinary skill in the art and not the patentee, but that person is creative and not an automaton, constrained by a rigid framework. *Id.* at 1742. However, "the reference[s] must be viewed without the benefit of hindsight afforded to the disclosure." *In re Paulsen*, 30 F.3d 1475, 1482 (Fed. Cir. 1994).

The prior art cited in an obviousness determination should create a reasonable expectation, but not an absolute prediction, of success in producing the claimed invention. *In re O'Farrell*, 853 F.2d. 894, 903-04 (Fed. Cir. 1988). Both the suggestion and the expectation of success must be in the prior art, not in applicant's disclosure. *Amgen, Inc. v. Chugai Pharmaceutical Co., Ltd.*, 927 F.2d 1200, 1207 (Fed. Cir. 1991)



(citing *In re Dow Chem. Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988)). Further, the implicit and inherent teachings of a prior art reference may be considered under a Section 103 analysis. See *In re Napier*, 55 F.3d 610, 613 (Fed. Cir. 1995).

Secondary considerations such as commercial success, long-felt but unsolved needs, failure of others, and unexpected results, if present, can also be considered. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538-39 (Fed. Cir. 1983). Although these factors can be considered, they do not control the obviousness conclusion. *Newell Cos. v. Kenney Mfg. Co.*, 864 F.2d 757, 768 (Fed. Cir. 1988).

To establish obviousness, the prior art references must be evaluated as a whole for what they fairly teach and neither the references' general nor specific teachings may be ignored. *Application of Lundsford*, 357 F.2d. 385, 389-90 (CCPA 1966). A reference must be considered for all that it teaches, not just what purportedly points toward the invention but also that which teaches away from the invention. *Ashland Oil, Inc. v. Delta Resins & Refractories*, 776 F.2d. 281, 296 (Fed. Cir. 1985).

Amended independent claim 1 recites, *inter alia*, a process for extraction of zinc and lead comprising heating a composite body of said material and a carbonaceous material in a reduction zone, collecting said zinc vapour from said reduction zone and cooling it to form liquefied or solid zinc, further heating the material remaining, after said zinc vapour has been collected from said reduction zone, to a temperature sufficient to effect melting of the iron and lead therein, and separately recovering molten iron and separately recovering molten lead therefrom.

Ishikawa describes an arrangement for recycling iron and steel industry waste by means of an inclined rotary kiln in which the vaporizable matter is separated from solid

matter. (See Ishikawa, Abstract). Both the vaporizable matter and solid matter are delivered to a secondary combustion chamber 11 of an upright form in which unburnt materials contained in a discharged gas are completely combusted and solid matter is converted to a melt/slag mix. (See *Id.*, Abstract and Fig. 1). The solid material is heated in the secondary combustion chamber 11 along with the gaseous discharge including the zinc vapour, and so heated to a melt temperature in the presence of the zinc vapour. Thus, at least for such reason, Applicants respectfully assert that Ishikawa does not teach or suggest separate recovery of molten iron and molten lead, as recited in amended independent claim 1.

The Examiner agrees Ishikawa fails to teach or suggest this recitation of amended independent claim 1, but alleges that Matsuoka teaches or suggests such recitation. However, Applicants respectfully disagree, and submit that Matsuoka does not cure the deficiencies of Ishikawa to teach or suggest such recited subject matter. Matsuoka describes an arrangement having a pre-heating/pre-reducing furnace 3, in which the conditions are such that the reduction of iron oxide proceeds selectively while the reduction of zinc oxide is suppressed to a minimum, and the zinc is recovered as vapour from the induction melting furnace 5. (See Matsuoka, Abstract and Fig. 1).

Thus, the arrangement of Matsuoka provides co-entrained zinc and lead vapour that must be separated. In Matsuoka, the zinc is not removed before the lead and iron are melted, and therefore, Matsuoka does not teach or suggest separate recovery of the molten iron and molten lead, as recited in amended independent claim 1.

Accordingly, Ishikawa, taken individually or in combination with Matsuoka, fails to teach or suggest the recitations of amended independent claim 1. The additional cited

publications of Wetzel, Wildman, Yasukawa, Freeman, Stockinger, Gordon and Cattelain do not cure the deficiencies of Ishikawa and Matsuoka, and the Examiner does not contend that they do.

Regarding the various § 103(a) rejections of claims 2-4, 6-8 and 10-16, which depend from amended independent claim 1, because Ishikawa and Matsuoka fail to teach or suggest the recitations of amended independent claim 1, Applicants respectfully assert that these dependent claims are also not taught or suggested by Ishikawa, taken individually or in combination with Matsuoka.

Regarding the various § 103(a) rejections of claims 21 and 23-31, which depend from amended independent claim 17, because Stift and Baily fail to disclose, either expressly or inherently, each and every element of amended independent claim 17, Applicants respectfully assert that the dependent claims are believed to be patentable over the prior art at least for the reasons as set forth above with respect to amended independent claim 17.

Therefore, for at least the reasons as presented herein above, Applicants respectfully request withdrawal of the various 35 U.S.C. § 103(a) rejections of claims 1-4, 6-8, 10-16 and 21-31.

IV. CONCLUSION

In light of the foregoing, Applicants respectfully submit that pending claims 1-4, 6-8, 10-20 and 22-33 are in condition for allowance. Prompt consideration, reconsideration and allowance of the present application are therefore earnestly solicited. If any issues remain outstanding, the Examiner is invited to contact the undersigned via the telephone number provided below.

Respectfully submitted,

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